

An Infrared Fiber-Optic Raman Sensor for Field Detecting of Organic Biomarkers, Phase I

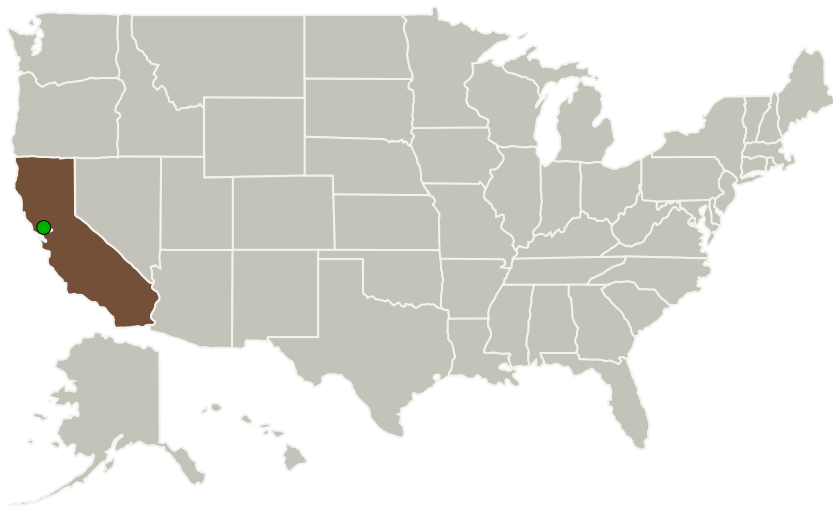
Completed Technology Project (2010 - 2010)



Project Introduction

High throughput, fast detection and characterization of inorganic and organic biomarkers have become important challenge for future lunar robotic rover exploration and planetary missions. To allow for rapid sample characterization on the Moon and Mars, the in situ non-destructive Raman detection technique is a highly desirable sensing tool for both qualitative and quantitative analysis. However, current Raman systems deployed in the field are inadequate due to deleterious fluorescence interference. Fluorescence is often several orders of magnitude more intense than Raman scattering signals and its broad structures spectrum could be difficult to remove from Raman spectra. We propose to develop a new infrared fiber-optic Raman sensor that can eliminate fluorescence with significantly improved Raman sensitivity for fast field detections. The proposed concept is based on recent technology advances in fiber lasers, fiber optic Raman probes and infrared detector arrays. Innovative infrared fiber-optic Raman sensor enables highly sensitive fluorescence-free Raman analysis and offers flexible remote detection, so that the field spectrometer's overall performance would be intact and extremely flexible for planetary missions. No dispersive Raman system today offers the unique fluorescence elimination for rapid in-situ fiber-optic remote detection.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Crystal Research, Inc.	Lead Organization	Industry	Fremont, California
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

California

Project Transitions

**January 2010:** Project Start**July 2010:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140011>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Crystal Research, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Suning Tang

Co-Investigator:

Suning Tang

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Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.1 Field and Particle Detectors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System